CLAIM AMENDMENTS

1(PREVIOUSLY PRESENTED). A method for dynamically inserting gain in an adaptive filter system, comprising:

receiving a desired signal and a reference signal;

filtering the reference signal to provide an estimated desired signal;

generating an error signal based on the desired and estimated desired signals; and

applying a predetermined gain function to the error signal during a predetermined period of time to produce an output signal,

wherein the predetermined period of time for applying the predetermined gain function is independent of the error signal.

2(ORIGINAL). The method of claim 1, further comprising detecting an abrupt change in the desired signal, wherein applying the predetermined gain function is performed in response to detecting the abrupt change.

3(ORIGINAL). The method of claim 1, wherein applying the predetermined gain function is performed after the desired signal surpasses an initial threshold value.

4(ORIGINAL). The method of claim 1, wherein the predetermined period of time comprises a speed-up period, a hang-over period, and a release period.

5(ORIGINAL). The method of claim 4, wherein at a start of the predetermined period of time, the predetermined gain function is at a first gain level, and during the speed-up period, the predetermined gain function is reduced to a second gain level.

6(ORIGINAL). The method of claim 5, wherein during the speed-up period, the predetermined gain function is reduced by at least 25 percent.

7(ORIGINAL). The method of claim 5, wherein the speed-up period is at least 1 percent and at most 4 percent of the predetermined period of time.

8(ORIGINAL). The method of claim 5, wherein during the hang-over period, a level of the output signal is maintained at a target level.

9(ORIGINAL). The method of claim 8, wherein during the release period, the predetermined gain function is restored to the first gain level.

10(ORIGINAL). The method of claim 9, wherein the predetermined gain function is gradually increased to the first gain level and wherein the release period is at least 20 percent of the predetermined period of time.

11(ORIGINAL). The method of claim 10, wherein the release period is at least 50 percent of the predetermined period of time.

12(ORIGINAL). The method of claim 10, wherein filtering the reference signal is performed by an adaptive filter and the release period comprises a first release period which corresponds to adaptation of the adaptive filter and a second release period which is independent of adaptation of the adaptive filter.

13(ORIGINAL). The method of claim 1, wherein the predetermined gain function disables itself at an end of the predetermined period of time.

14(ORIGINAL). The method of claim 1, wherein filtering the reference signal is performed by an adaptive filter having a first step size when applying the predetermined gain function and having a second step size when the adaptive filter is adapting and the predetermined gain function is not being applied.

15(ORIGINAL). The method of claim 14, wherein the first step size is larger than the second step size.

16(ORIGINAL). The method of claim 1, further comprising:

detecting whether a near-end signal is present in the adaptive filter system, wherein when a near-end signal is detected during applying the predetermined gain function, the predetermined gain function is not applied during a remainder of the predetermined period of time.

17(ORIGINAL). A method for detecting an abrupt change in an adaptive filter system, comprising:

receiving a desired signal generated by a communication system;

receiving a reference signal;

filtering the reference signal using an adaptive filter to provide an estimated desired signal;

generating an error signal based on the desired and estimated desired signals;

generating an output signal based on the error signal;

performing power estimations of the desired signal, reference signal, error signal, and estimated desired signal; and

based on the power estimations, detecting an abrupt change of the communication system.

18(ORIGINAL). The method of claim 17, further comprising:

in response to detecting the abrupt change of the communication system, applying a predetermined gain function to the error signal during a predetermined period of time to produce the output signal.

19(ORIGINAL). The method of claim 18, wherein the predetermined period of time comprises a speed-up period, a hang-over period, and a release period.

20(ORIGINAL). The method of claim 19, further comprising:

performing a power estimation of the output signal, wherein the power estimation of the output signal is used to maintain a target output level during the hang-over period.

21(ORIGINAL). The method of claim 20, further comprising:

selectively performing non-linear processing of the output signal, wherein the target output level has a first value when non-linear processing is performed and a second value when non-linear processing is not performed.

22(ORIGINAL). The method of claim 17, wherein detecting the abrupt change comprises:

when the power estimation of the error signal is larger than the power estimation of the desired signal, the abrupt change is detected when a minimum of the power estimation of the error signal and the power estimation of the estimated desired signal is within a first predetermined range of a maximum of the power estimation of the error signal and the power estimation of the estimated desired signal.

23(ORIGINAL). The method of claim 22, wherein the first predetermined range corresponds to 25 percent of the maximum of the power estimation of the error signal and the power estimation of the estimated desired signal.

24(ORIGINAL). The method of claim 22, wherein the first predetermined range corresponds to 10 percent of the maximum of the power estimation of the error signal and the power estimation of the estimated desired signal.

25(ORIGINAL). The method of claim 22, wherein when the power estimation of the error signal is larger than the power estimation of the desired signal, the abrupt change is detected when the minimum of the power estimation of the error signal and the power estimation of the estimated desired signal is within the first

predetermined range of the maximum of the power estimation of the error signal and the power estimation of the estimated desired signal for a predetermined amount of time.

26(ORIGINAL). The method of claim 22, wherein detecting the abrupt change further comprises:

when the power estimation of the error signal is larger than the power estimation of the desired signal, the abrupt change is detected when a minimum of the power estimation of the desired signal and the power estimation of the estimated desired signal is outside a second predetermined range of a maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal.

27(ORIGINAL). The method of claim 26, wherein the second predetermined range corresponds to 25 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal.

28(ORIGINAL). The method of claim 26, wherein the second predetermined range corresponds to 10 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal.

29(ORIGINAL). The method of claim 26, wherein when the power estimation of the error signal is larger than the power estimation of the desired signal, the abrupt change is detected when the minimum of the power estimation of the desired signal and the power estimation of the estimated desired signal is outside the second predetermined range of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal for a predetermined amount of time.

30(ORIGINAL). The method of claim 26, wherein detecting the abrupt change further comprises:

when the power estimation of the error signal is less than the power estimation of the desired signal, the abrupt change is detected when the adaptive filter has converged, a minimum of the power estimation of the desired signal and the power estimation of the estimated desired signal is outside a third predetermined range of a maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and a minimum of the power estimation of the desired signal and the power estimation of the error signal is outside a fourth predetermined range of a maximum of the power estimation of the desired signal and the power estimation of the error signal.

31(ORIGINAL). The method of claim 30, wherein the third predetermined range corresponds to 50 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and the fourth predetermined range corresponds to 50 percent of the maximum of the power estimation of the desired signal and the power estimation of the error signal.

32(ORIGINAL). The method of claim 30, wherein the third predetermined range corresponds to 25 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and the fourth predetermined range corresponds to 25 percent of the maximum of the power estimation of the desired signal and the power estimation of the error signal.

33(ORIGINAL). The method of claim 30, wherein when the power estimation of the error signal is less than the power estimation of the desired signal, the abrupt change is detected when the adaptive filter has converged, the minimum of the power estimation of the desired signal and the power estimation of the estimated desired signal is outside the third predetermined range of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal for a first predetermined amount of time, and the minimum of the power estimation of the desired signal and the power estimation of the error signal

is outside the fourth predetermined range of the maximum of the power estimation of the desired signal and the power estimation of the error signal for a second predetermined amount of time.

34(ORIGINAL). The method of claim 17, wherein detecting the abrupt change further requires:

when the power estimation of the error signal is less than the power estimation of the desired signal, the abrupt change is detected when the adaptive filter has converged a minimum of the power estimation of the desired signal and the power estimation of the estimated desired signal is outside a first predetermined range of a maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and a minimum of the power estimation of the desired signal and the power estimation of the error signal is outside a second predetermined range of a maximum of the power estimation of the desired signal and the power estimation of the error signal.

35(ORIGINAL). The method of claim 34, wherein the first predetermined range corresponds to 50 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and the second predetermined range corresponds to 50 percent of the maximum of the power estimation of the desired signal and the power estimation of the error signal.

36(ORIGINAL). The method of claim 34, wherein the first predetermined range corresponds to 25 percent of the maximum of the power estimation of the desired signal and the power estimation of the estimated desired signal, and the second predetermined range corresponds to 25 percent of the maximum of the power estimation of the desired signal and the power estimation of the error signal.

37(CURRENTLY AMENDED). An adaptive filter system stored via at least one computer readable medium, wherein the adaptive filter system has ~~having~~ a plurality of instructions for implementing the method of claim 17.

38(ORIGINAL). A method for detecting an abrupt change in an adaptive filter system, comprising:

receiving a desired signal generated by a communication system;

receiving a reference signal;

filtering the reference signal using an adaptive filter to provide an estimated desired signal;

generating an error signal based on the desired and estimated desired signals;

generating an output signal based on the error signal;

obtaining a distance between previous coefficients of the adaptive filter and current coefficients of the adaptive filter; and

using the distance to detect an abrupt change of the communication system.

39(ORIGINAL). The method of claim 38, further comprising:

in response to detecting the abrupt change of the communication system, applying a predetermined gain function to the error signal during a predetermined period of time to produce the output signal.

40(ORIGINAL). The method of claim 39, wherein the predetermined period of time comprises a speed-up period, a hang-over period, and a release period.

41(ORIGINAL). The method of claim 38, wherein using the distance to detect the abrupt change comprises:

determining a background signal level of the communication system; and

detecting the abrupt change when the distance is greater than the background signal level.

42(ORIGINAL). The method of claim 38, further comprising determining a background signal level, and wherein obtaining the distance comprises:

determining a polynomial function using the estimated desired signal level and the background signal level;

using the polynomial function to detect whether a near-end signal is present; and

selectively determining previous coefficients of the adaptive filter when the near-end signal is not detected.

43(CURRENTLY AMENDED). An adaptive filter system stored via at least one computer readable medium, wherein the adaptive filter system has ~~having~~ a plurality of instructions for implementing the method of claim 38.

44(ORIGINAL). A method for dynamically inserting gain in an adaptive filter system, comprising:

receiving a desired signal and a reference signal;

filtering the reference signal to provide an estimated desired signal;

generating an error signal based on the desired and estimated desired signals;

determining a polynomial function using a power estimation of the error signal and a power estimation of the desired signal;

generating an adaptive gain function based on the polynomial function and a feedback signal; and

applying the adaptive gain function to the error signal to produce an output signal, wherein the output signal provides the feedback signal.

45(ORIGINAL). The method of claim 44, wherein generating the adaptive gain function based on the polynomial function comprises:

setting a gain adjustment rate for the adaptive gain function based on the polynomial function; and

setting a reference level for the adaptive gain function based on the polynomial function.

46(ORIGINAL). The method of claim 45, wherein when a power estimation of the output signal is less than the reference level, increasing the adaptive gain function using the gain adjustment rate and when the power estimation of the output signal is greater than the reference level, decreasing the adaptive gain function using the gain adjustment rate.

47(ORIGINAL). The method of claim 46, wherein the gain adjustment rate has a first value when increasing the adaptive gain function and has a second value when decreasing the adaptive gain function, the first value different from the second value.

48(ORIGINAL). The method of claim 46, wherein the reference level for the adaptive gain function is a function of a background signal level of the adaptive filter system.

49(CURRENTLY AMENDED). An adaptive filter system stored via at least one computer readable medium, wherein the adaptive filter system has ~~having~~ a plurality of instructions for implementing the method of claim 44.

50(PREVIOUSLY PRESENTED). An adaptive filter system comprising:

an adaptive filter which receives a reference signal and provides an estimated desired signal; and

a gain unit which receives an error signal based on a desired signal and the estimated desired signal and provides an output signal, the gain unit applying a predetermined gain function to the error signal during a predetermined period of time that is independent of the error signal to produce the output signal.

51(ORIGINAL). The adaptive filter system of claim 50, further comprising:

an abrupt change detector coupled to the gain unit which detects an abrupt change in the desired signal, wherein the gain unit applies the

predetermined gain function in response to the abrupt change detector detecting the abrupt change.

52(ORIGINAL). The adaptive filter system of claim 50, wherein the adaptive filter system is implemented as a plurality of instructions stored via at least one computer readable medium.

53(ORIGINAL). The adaptive filter system of claim 50, wherein the predetermined period of time comprises a speed-up period, a hang-over period, and a release period.

54(ORIGINAL). The adaptive filter system of claim 53, wherein at a start of the predetermined period of time, the predetermined gain function is at a first gain level, and during the speed-up period, the predetermined gain function is reduced to a second gain level.

55(ORIGINAL). The adaptive filter system of claim 54, wherein during the hang-over period, a level of the output signal is maintained at a target level.

56(ORIGINAL). The adaptive filter system of claim 55, wherein during the release period, the predetermined gain function is restored to the first gain level.

57(ORIGINAL). The adaptive filter system of claim 50, wherein the adaptive filter system is a portion of an echo canceller.

58(CURRENTLY AMENDED). At least one computer readable medium for storing a plurality of instructions of an adaptive filter system, the ~~An adaptive filter system stored via at least one computer readable medium having a~~ plurality of instructions for implementing a method comprising:

receiving a desired signal and a reference signal;

filtering the reference signal to provide an estimated desired signal;

generating an error signal based on the desired and estimated desired signals; and

applying a predetermined gain function to the error signal during a predetermined period of time to produce an output signal,

wherein the predetermined gain function is independent of the error signal.

59(ORIGINAL). The adaptive filter system of claim 58, further comprising instructions for detecting an abrupt change in the desired signal, wherein applying the predetermined gain function is performed in response to detecting the abrupt change.

60(ORIGINAL). The adaptive filter system of claim 58, wherein the predetermined period of time comprises a speed-up period, a hang-over period, and a release period.

61(ORIGINAL). The adaptive filter system of claim 60, wherein at a start of the predetermined period of time, the predetermined gain function is at a first gain level, and during the speed-up period, the predetermined gain function is reduced to a second gain level.

62(ORIGINAL). The adaptive filter system of claim 61, wherein during the hang-over period, a level of the output signal is maintained at a target level.

63(ORIGINAL). The adaptive filter system of claim 62, wherein during the release period, the predetermined gain function is restored to the first gain level.